

DEPARTMENT OF RURAL TECHNOLOGY
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand
Curriculum and Syllabus for Ph.D. (Rural Technology), 2022

Core Courses

Course No.	Course Title	Credits
SOA/RT/ C101	Research Methodology & Computer Applications	4 (3+1)
SOA/RT/ C102	A. Research and Publication Ethics (RPE)	2(1+1)
	B. Appraisal and Action For Rural Development	1 (1+0)
	Total	7(5+2)

Elective Courses

The candidate will have to take any two elective courses

SOA/RT/ E103	Information and communication Technology	4(3+1)
SOA/RT/ E104	Post-harvest Techniques of Fruit and Vegetable	4 (3+1)
SOA/RT/ E105	Rural Tourism: Concepts and Approaches	4(3+1)
SOA/RT/ E106	Application of Remote Sensing and GIS	4(3+1)

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Course Code	Paper Title	Theory marks		Practical marks	Total Marks	Credits
		E	I	P/T		
Core Paper						
SOA/RT/ C101	Research Methodology & Computer Applications	60	20	20	100	3+1
SOA/RT/ C102	A. Research and Publication Ethics	60	20	20	100	1+1
	B. Appraisal And Action For Rural Development	60	20	20	100	1+0
Elective: The candidate will have to take any two elective courses						
SOA/RT/ E103	Information and communication Technology	60	20	20	100	3+1
SOA/RT/ E104	Post-harvest Techniques of Fruit and Vegetable	60	20	20	100	3+1
SOA/RT/ E105	Rural Tourism: Concepts and Approaches	60	20	20	100	3+1
SOA/RT/ E106	Application of Remote Sensing and GIS	60	20	20	100	3+1

I- Internal Assessment**E-External Assessment****P- Practical****T-Term Paper instead of Practical**

Core Courses

SOA/RT/ C101: Research Methodology & Computer Applications 4(3+1)

Research Design and Data Collection: Research methodology- definition, different types of research design. Basic principles of experimental designs. Sampling design- sample survey, steps in sample design, criteria of selecting a sampling procedure and different types of sample designs. Methods of Data Collection: Primary and secondary data. Literature collection and citation, bibliography. Writing skills - Preparation of research report, presentations, and writing scientific paper. Impact factor, Citation index, Ethics in research; Plagiarism, ISBN, ISSN.

Processing and Analysis of Data and Sampling: Processing operations, elements/types of analysis, statistics in research, Simple regression and correlation.

Testing of Hypotheses: Basic concepts of testing of hypothesis, procedures for hypothesis testing. Hypothesis testing for differences between means, hypothesis testing for comparing two related samples. Testing the equality of variances of two normal populations, hypothesis testing of correlation coefficient. Chi square test

Analysis of Variance and Covariance: Analysis of Variance and Covariance (basic principles of one-way ANOVA, two-way ANOVA and ANCOVA).

Application of Computer in Research: MS office and its application in Research – MS Word, MS Power point and MS Excel; Basic principles of Statistical Computation using SPSS; Use of Internet in Research – Websites, search Engines, E-journal and E-Library – INFLIBNET.

Practicals

Based on above.

Suggested Readings:

- ❖ Cox J and Urban P. 1990. Quick Course in Microsoft Office. Galgotia Publications, New Delhi.
- ❖ Creswell JW. 2002. Research Design: Qualitative, Quantitative and Mixed Methods Approaches. 2nd Edition, SAGE Publications.
- ❖ Devore JL. 2002. Probability and Statistics for Engineering and the Sciences. 5th Edition, Thomson and Duxbury, Singapore.
- ❖ Freund JE. 2001. Mathematical Statistical. 5th Edition, Prentice Hall of India.
- ❖ George TCG. 2015. Research Methodology and Scientific Writing. Ane Books Pvt. Ltd.
- ❖ Gupta SC and Kapoor VK. 2002. Fundamentals of Mathematical Statistics. Sultan Chand and Sons, Eleventh Edition.
- ❖ Jain S. 1990. Introduction to Computer Science and Basic Programming. BPB Publications, New Delhi.
- ❖ Kothari CR. 2018. Research Methodology: Methods and Techniques, New Age International.
- ❖ Krishnaswamy KN. 2009. Management Research Methodology: Integration of Principles,
- ❖ Kumar R. 2014. Research Methodology: A Step-By-Step Guide for Beginners. 4th Edition, SAGE Publications.
- ❖ Management and Social Sciences. Prentice-Hall of India Private Limited, New Delhi.
- ❖ Methods and Technique.
- ❖ Rajaraman V. 1996. Fundamental of Computers. Prentice Hall of India, New Delhi.
- ❖ Sahu PK and Das AK. 2009. Agriculture and Applied Statistics, Vol-I, II. Kalyani Publishers, New Delhi.
- ❖ Sanders DH. 1981. Computer Today, NY: McGraw Hill.
- ❖ Saxena S. 1998. A First Course in Computers. Vikas Publishing House Pvt. Ltd., New Delhi.
- ❖ Sinha PK. 1992. Computer Fundamentals. BPB Publications, New Delhi.

SOA/RT/ C102 (A+B)

3(2+1)

SOA/RT/ C102: A. Research and Publication Ethics 2(1+1)

Philosophy and Ethics (3 hrs.)

- Introduction to Philosophy: definition, nature and scope, concept, branches
- Ethics: definition, moral philosophy, nature of moral judgements and reactions

Scientific Conduct (5 hrs.)

- Ethics with respect to science and research
- Intellectual honesty and research integrity
- Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP)
- Redundant publications: duplicate and overlapping publications, salami slicing
- Selective reporting and misrepresentation of data

Publication Ethics (7 hrs.)

- Publication ethics: definition, introduction and importance
- Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
- Conflicts of interest
- Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice-versa, types
- Violation of publication ethics, authorship and contributorship
- Identification of publication misconduct, complaints and appeals
- Predatory publishers and journals

Practicals

Open Access Publishing (4 hrs.)

- Open access publications and initiatives
- SHERPA/ RoMEO online resource to check publisher copyright & self- archiving policies
- Software tool to identify predatory publications developed by SPPU
- Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

Publication Misconduct (4 hrs.)

Group Discussions (2 hrs.)

- Subject specific ethical issues, FFP, authorship
- Conflicts of interest
- Complaints and appeals: examples and fraud from India and abroad

Software tools (2 hrs.)

Use of plagiarism software like Turnitin, Urkund and other open source software tools

Databases and Research Metrics (7 hrs.)

Databases (4 hrs.)

- Indexing databases
- Citation databases: Web of Science, Scopus, etc.

Research Metrics (3 hrs.)

- Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
- Metrics: h- index, g index, i10 index, altmetrics

Suggested Reading:

- ❖ Adil E. Shamoo and David B. 2003. Resnik Responsible Conduct of Research, Oxford University Press.
- ❖ Anderson B.H., Dursaton, and Poole M. 1997. Thesis and assignment writing, Wiley Eastern.
- ❖ Barbara HS, Joan ES and Gary BM. Research Ethics: A Psychological Approach.
- ❖ Bijorn G. How to write and illustrate scientific papers? Cambridge University Press.

- ❖ Bordens KS. and Abbott BB. 2008. Research Design and Methods, Mc Graw Hill.
- ❖ Graziano AM and Raulin ML. 2007. Research Methods: A Process of Inquiry, Sixth Edition, Pearson.
- ❖ Jeffrey AG, George AM and Lawrence E. 2000. Research Methods in Applied Settings: An Integrated Approach to Design and Analysis.
- ❖ Joel L and Lawrence E. 2003. Ethics and Values in Industrial-Organizational Psychology.
- ❖ Kambadur M, Amit G and, Ashok KS. 2019. Ethics in Science Education, Research and Governance. Indian National Science Academy.
- ❖ Miro T, Paul K and Sidney H. The Ethics of Teaching and Scientific Research.
- ❖ Nicholas HS. 2007. Introduction to the Responsible Conduct of Research. Office of Research Integrity. Available at: <https://ori.hhs.gov/sites/default/files/rcrintro.pdf>
- ❖ Paul O. 2003. The Student's Guide to Research Ethics, Open University Press.

SOA/RT/ C102:B. Appraisal And Action For Rural Development1(1+0)

PRA- Definition, Principles and Approaches of PRA, PRA Tools- Mapping, Types of mapping social resource/ land use pattern map, enterprise map, transect walk, time line, change and trends, Matrix ranking, Mobility map, Venn diagram. RRA and PLA: Introduction, foundation, process, difference between RRA and PRA, Project appraisal.

Suggested Reading:

Rajesh Rajora.1998 Integrated Watershed Management, Field Manual for Equitable Productive and Sustainable Development, Rawat Publication, New Delhi

ELECTIVE COURSES

The candidate will have to take any two elective courses

SOA/RT/ E103:Information and communication Technology (3+1)

Communication process – concept, elements and their characteristics – Models and theories of communication - Communication skills – fidelity of communication, communication competence and empathy, communication effectiveness and credibility, feedback in communication, social networks and development communication – Barriers in communication, Message – Meaning, dimensions of a message, characteristics of a good message, Message treatment and effectiveness, distortion of message.

Methods of communication – Meaning and functions, classification, Forms of communication – Oral and written communication, Non-verbal communication, interpersonal communication, organizational communication, Key communicators – Meaning, characteristics and their role in development.

Media in communication- Role of mass media in dissemination of farm technology, Effect of media mix for rural people, Modern communication media – Electronic video, Tele text, Tele conference, Computer associated instruction, Computer technology and its implications.

Agricultural Journalism as a means of mass communication, Its form and role in rural development, Basics of writing – News stories, feature articles, magazine articles, farm bulletins and folders. Techniques of collection of materials for news stories and feature articles; Rewriting Art of clear writing, Readability and comprehension of testing procedures; Photo journalism, communicating with pictures, Radio and TV journalism, Techniques of writing scripts for Radio and TV.

Book Reference

- Dahama OP &Bhatnagar OP. 2005. Education and Communication for Development. Oxford & IBH. Grover I, Kaushik S, Yadav L & Varma SK. 2002. Communication and Instructional Technology. Agrotech Publ. Academy.

- Jana BL & Mitra KP. 2005. Farm Journalism. Agrotech Publ. Academy.
- Ray GL. 2006. Extension Communication and Management. Kalyani Publ. Rayud

SOA/RT/ E104: Post harvest Techniques of Fruit and Vegetable 4(3+1)

Introduction post harvest physio-biochemical changes; causes of post harvest losses, control of post harvest losses- proper cultural operations, pre-storage treatments, transportation, storage, environmental control, ionizing radiation, post harvest chemical treatments, storage of fresh fruits and vegetables, factor affecting storage quality, storage disorders, marketing of fruits and vegetables and their products.

Principles of preservation- temporary and permanent; Spoilage of fruits and vegetables, vitamins and other nutrients in preserved products, food additives and their use in preservation. Principles and guidelines for establishing processing unit.

Containers: Types, merits and demerits, composition and manufacturing of tin and glass containers, failures in glass containers, general principles and procedures of canning and bottling, spoilage of canned products.

Principles and methods of jam, jelly and marmalade; juice extraction equipments, general methods of preparation and preservation, unfermented fruit and vegetable beverages and their preservation. Preparation of pickles, chutneys, sauces, ketchup, soup from suitable fruits and vegetables, causes of spoilage.

Preservation by freezing- objectives, freezing and growth of micro-organisms, freezing process, storage of frozen products; exposure on preservation by radiation. Government policies, regulation and specifications for fresh and processed products.

Reference Book:

- Fruit and Vegetable Preservation, Principles and Practices: **R. P. Srivastava/ Sanjeev Kumar**, International Book Distributing Co.
- Post Harvest Management and Processing of fruit and Vegetables- Instant notes: **Satish Kumar Sharma**, New India Publishing Agency, PitamPura, New Delhi.
- Practical Manual Series-2: Post Harvest technology of Horticultural Crops: **S. K. Sharma/ M. C. Nautiyal**, New India Publishing Agency, PitamPura, New Delhi.

SOA/RT/ E105: Rural Tourism: Concepts and Approaches 4(3+1)

Rural Tourism: Understanding of rural tourism, definition, features, destination typology (agri tourism, eco tourism etc.) and history .

Rural Tourism Resources and Product Design: Characteristics and activities of rural tourism, Impact of rural tourism, principles for rural tourism, criteria for success in rural tourism.

Planning and Management of Rural Tourism: community participation in rural tourism, marketing of rural tourism. Popular rural tourism destination in India case study

Rural Tourism Scenario in India: meaning and definition of rural tourism, adaptation, role of department of tourism, Govt. of India. Current status and future prospectus, issues and challenges in development and promotion of rural tourism in India

Rural Tourism in Uttarakhand: Role of Uttarakhand Tourism Development Board (UTDB) in rural tourism, development and promotion, Case study of popular rural tourism villages of Uttarakhand

Reference Book:

- Rural Tourism- An Introduction, Sharpley, Rechar and Julia, International Thomson Business Press.
- Tourism: A Modern Synthesis Page J. Stephen, et. al. Thomson, U.K.
- Tourism, Technology and competitive strategies Poon, A, Wallingford, CAB International.

SOA/RT/ E105: Application of Remote Sensing and GIS **4(3+1)**

Remote Sensing: Fundamental & concept of remote sensing, Electromagnetic Energy, Energy interaction with Earth surface features, Spectral response of natural earth surface features. Sensor systems used in remote sensing: Passive system, Active system, spectral enhancement techniques – NDVI, NDWI

Aerial Photography: Types of Aerial photographs, how aerial photographs are taken. Errors in flying, Geometry of Aerial photographs, aerial camera, aerial film negative, Stereoscopes, How to order fresh photography.

Global Positioning System: Introduction, space segment, ground control segment, user segment, errors in GPS, applications of GPS.

Principles of Geographic Information System (GIS): Definition, GIS applications, Components of GIS, geographically referenced data, spatial data, attribute data, GIS operations, Types of data structure, Raster and Vector formats, Advantages and disadvantages of various data structure.

Spatial Objects: Points, lines, polygons, relationships between spatial objects, adjacency, connectivity, containment, digital elevation models (DEM)

Data Input: Method of data capture, digitization and scanning methods, data output.

Practical:

Practical on photogrammetry, Visual interpretation of aerial photos on different scale, tracing of details from stereo pair, Georeferencing, GPS field study.

Reference Book:

- An Introduction to Geographical Information Systems: Ian Heywood, Sarah Connellus, Steve Carver, Srinivasa Raju, Dorling Kindersley (India) Pvt. Ltd.
- Concepts and Techniques of Geographic Information Systems: C.P.Lo. Albert, K.E. Yeung, PHI Learning Pvt. Ltd. New Delhi-110001.
- Geographical Introduction Science: Narayan Panigrahi, Universities Press (India) Pvt. Ltd.
- Remote Sensing in Geology: SM. Ramasamy, Rawat Publications, Jaipur and New Delhi.
- Remote Sensing and Image Interpretation: Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W. Chipman, Wiley India, Pvt. Ltd. Daryaganj New Delhi.
- Geographic Information Systems and Science: Paul A. Longley, Michael F. Good child, David J. Maguire, David W. Rhind, John Wiley & Sons, Ltd.